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NRO REVIEW COMPLETED

CXC-4987-63

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17 May 1963

MEMORANDUM FOR THE RECORD

SUBJECT : OXCART Program Engine
Starting Capability

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1. Two separate starting systems are now in use
 A third system is in development. They are:

- a) AiResearch ATS-200 Backup-in use.
- b) AiResearch ATS-400 Followon-in development.
- c) Hamilton-Standard Hot Rod-in use.

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2. The AiResearch ATS-200 Backup system was developed and delivered during the summer 1962 to provide an alternate system as a temporary backup to the then inadequate Hamilton-Standard starter. The purpose of this admittedly cumbersome system was to provide a backup starting capability for one or two aircraft as needed and the engine test stand. This system comprises three air turbines mounted on a gearbox with air supplied by a combination of two TMC-105 carts and one MA-2 cart for each engine start. At present, twelve air turbines which are used in sets of three support this system. Each air turbine is capable of 25 installed engine starts before overhaul. These twelve air turbines in four sets of three each cycle between [] and overhaul with a 14 day overhaul turnaround time. During this summer, current flight programming may require as much as the equivalent of 20 installed engine starts per day. If this total requirement fell on the ATS-200 system alone, a hypothetical situation, the system, assuming a 100% batting average, would have a capability equal to approximately 20% of the requirement.

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3. The AiResearch ATS-400 followon USAF system, a Lockheed procurement about which little is known, comprises one large air turbine powered by two or three TMC-105 carts initially for each engine start. This design, still in development, is understood to provide for cartridge powered starting at some future date. Six units are understood to be on order with delivery initially targeted starting in January 1963 with completion in June 1963. To date, only one of these six is known to have been delivered [] and then returned to the vendor for rework.

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Each of these six turbines is to be capable of 50 installed engine starts before overhaul. Assuming a 30 day overhaul turnaround

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time and a mid-summer requirement of 20 installed starts per day, this system by itself if delivered would provide a maximum (100% batting average) capability equal to approximately 42% of the total requirement. It should be recalled that this system is being procured primarily for the Air Force aircraft.

4. The Hamilton Standard Hot Rod starter of which three have been procured primarily for OXCART aircraft use [] is a self contained unit powered by two "souped up" Buick engines. The first unit, modified by Hamilton-Standard, is in serviceable condition at [] It has made 465 starts since the modification. The second unit, modified by Lockheed, is [] disassembled because of engine piston seizure. The third unit, modified by Lockheed, has been returned to Burbank because of engine low oil pressure. If these three units were all working properly and assuming a capability of 1000 starts before overhaul for each unit with a 60 day overhaul turnaround time, this system by itself theoretically would be capable of meeting the mid-summer requirement of 20 installed starts per day. Practically, however, it is difficult to see how the two serviceable units (one in overhaul at all times) conveniently could be spread over eight to ten aircraft the majority of which we hope will require at least two simultaneous starts during the day.

SIGNED

[]
Development Division
(Special Activities)

[] DD/OSA [] (17 May 1963)

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